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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: **Brewer et al.**

Serial No.: **09/599,180**

Filed: **June 22, 2000**

For: **Apparatus and a Method for Diagnosing Problems on a Network Computer**

§ Group Art Unit: **2155**
§
§ Examiner: **Tran, Philip B.**
§
§ Attorney Docket No.: **AUS000213US1**
§

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By: Amelia C Turner
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Sir:
ENCLOSED HEREWITH:

- Appellant's Brief (in triplicate) (37 C.F.R. 1.192); and
- Our return postcard.

A fee of $330.00 is required for filing an Appellant's Brief. Please charge this fee to IBM Corporation Deposit Account No. 50-0563. No additional fees are believed to be necessary. If, however, any additional fees are required, I authorize the Commissioner to charge these fees which may be required to IBM Corporation Deposit Account No. 50-0563. No extension of time is believed to be necessary. If, however, an extension of time is required, the extension is requested, and I authorize the Commissioner to charge any fees for this extension to IBM Corporation Deposit Account No. 50-0563.

Respectfully submitted,

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ATTENTION: Board of Patent Appeals and Interferences

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By: Amelia C. Turner
Amelia C. Turner

APPELLANT'S BRIEF (37 C.F.R. 1.192)

This brief is in furtherance of the Notice of Appeal, filed in this case on January 29, 2004.

The fees required under § 1.17(c), and any required petition for extension of time for filing this brief and fees therefore, are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief is transmitted in triplicate. (37 C.F.R. 1.192(a))

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REAL PARTIES IN INTEREST

The real party in interest in this appeal is the following party: International Business Machines Corporation

RELATED APPEALS AND INTEREERENCES

With respect to other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in the pending appeal, there are no such appeals or interferences.

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STATUS OF CLAIMS

A. TOTAL NUMBER OF CLAIMS IN APPLICATION

Claims in the application are: 1-22

B. STATUS OF ALL THE CLAIMS IN APPLICATION

1. Claims canceled: NONE
2. Claims withdrawn from consideration but not canceled: NONE
3. Claims pending: 1-22
4. Claims allowed: NONE
5. Claims rejected: 1-10 and 12-22

C. CLAIMS ON APPEAL

The claims on appeal are: 1-10 and 12-22

STATUS OF AMENDMENTS

There are no amendments after final Office Action.

SUMMARY OF INVENTION

A diagnostic adapter card is provided for diagnosing hardware and software problems on a network computer. The diagnostic adapter card is installed in an open slot in the system bus and, thus, has access to all the network computer electronics and peripherals. See specification, page 16, line 29, to page 17, line 10. Diagnostic programs are run and the results are logged. See specification, page 17, line 11, to page 18, line 15. By analyzing these results, the source of the problem can be determined and reported for service or repair. The diagnostic adapter card contains interface logic for connecting to the system bus, a set of external wrap cables for peripheral connector testing, and an external reporting device. Some tests require use of a wrap cable to connect two or more ports together. See specification, page 19, lines 2-26. Other tests, such as PCI bus timing or memory integrity, do not require the use of wrap cables.

ISSUES

The issues on appeal are as follows:

Whether claims 1-5, 7-10, 13-15, and 17-21 are unpatentable as being anticipated by *Congdon* (US Patent No. 6,311,296).

Whether claims 6, 16, and 22 are unpatentable as being obvious over *Congdon* (US Patent No. 6,311,296) in view of *Pickreign et al.* (US Patent No. 6,539,338).

Whether claim 12 is unpatentable as being obvious over *Phillips* (US Patent No. 6,311,296) in view of *Ellis et al.* (US Patent No. 6,256,687).

GROUPING OF CLAIMS

The claims on appeal do not stand or fall in a single group, but are grouped into in the following groups for the reasons set forth in the Argument section below:

Claims 1, 2, 4, 5, 7-9, and 17-21 form group A. Claim 3 forms group B. Claims 10 and 13-15 form group C. Claims 6, 16, and 22 form group D. Claim 12 forms group E.

ARGUMENT

The Office Action rejects claims 1-5, 7-10, 13-15, and 17-21 under 35 U.S.C. § 102 (e) as being allegedly anticipated by *Congdon* (U.S. Patent No. 6,311,296). This rejection is respectfully traversed.

I. The Prior Art Does Not Teach Running Diagnostic Testing Programs on a Diagnostic Adapter Card (Groups A-E)

As to independent claims 1, 7, and 17, the Office Action states:

> Regarding claim 1, Congdon teaches a method in a network computer for diagnosing a problem comprising the steps of:
>
> running diagnostic programs on a diagnostic adapter card coupled to the network computer (i.e., PCI management card 200 is constructed or programmed with software running on it) [see Figs. 1&2 and Col. 3, Lines 3-17 and Col. 3, Lines 37-43];
>
> reporting the results from running the diagnostic programs (i.e., reporting errors or failures locally or remotely over a computer network) [See Abstract and Col. 3, Lines 37-43]; and
>
> analyzing the results from running the diagnostic programs to determine a cause of the problem (i.e., the host computer ascertains the nature of failures or occurred events) [see Col. 7, Line 66-Col. 8, Line 10].

Office Action, dated October 31, 2003. Appellants respectfully disagree. *Congdon* is generally directed to a PCI bus-complaint plug-in management card that is used to evaluate a PCI bus in a host computer for correct operation. In particular, *Congdon* describes a method in which the management card monitors, records, and reports anomalies or failures of bus operations. This is accomplished by a reset snoop, which snoops the PCI bus for a PCI bus reset; a cycle snoop, which snoops the PCI bus for anomalies/failures in cycles on the PCI bus; and a clock snoop, which snoops the PCI bus for a PCI bus clock radically changing frequency or dying. An error capture may then capture error and fault conditions and report such failures to a local microprocessor for system management. See *Congdon*, column 3, lines 32-37 and column 7, lines 33-56.

Claim 1, which is representative of the other rejected independent claims 7 and 17 with regard to similarly recited subject matter, reads as follows:

> 1. A method in a network computer for diagnosing a problem, the method comprising the steps of:
>
> running diagnostic testing programs on a diagnostic adapter card coupled

to the network computer;

reporting the results from running the diagnostic testing programs; and

analyzing the results from running the diagnostic testing programs to determine a cause of the problem.

Appellants respectfully submit that *Congdon* does not identically show every element of the claimed invention arranged as they are in the claims. Specifically, *Congdon* does not teach running diagnostic **testing** programs on a diagnostic adapter card, reporting the results **from running the diagnostic testing programs**, and analyzing the results **from running the diagnostic testing programs to determine a cause** of the problem.

The Office Action alleges that the features of the present invention are taught by *Congdon*. However, Appellants respectfully submit that *Congdon* fails to teach running diagnostic testing programs, reporting the results from running the diagnostic testing programs, and analyzing the results from running the diagnostic testing programs to determine a cause of the problem. Regarding the step of running diagnostic testing programs, the Office Action alleges that this feature is taught in column 3, lines 3-17, 37-43. Column 3, lines 3-17 generally states that a PCI management card may be programmed to observe input/output signals passing through a PCI bus so as to **monitor** and report error and failure conditions occurring on the bus.

Moreover, in column 3, lines 37-43, *Congdon* generally states that software running on the PCI management card may signal locally to a host system or remotely to a remote system on a computer network that an anomalous event has occurred. There is no teaching or suggestion of running diagnostic **testing** programs on a diagnostic adapter card. As further explained by example in the specification (i.e., page 13, line 27-page 14, line 7), the present invention describes a method in which diagnostic tests may be conducted by sending out signals to a port to be tested. A return signal is received from the port to be tested, and the two signals are analyzed. The PCI management card of *Congdon* does not test; it does not run any diagnostic testing programs. Rather, the PCI management card of *Congdon* simply **monitors** for failures or anomalies.

The Office Action further states:

> Congdon teaches a method in a network computer for diagnosing a problem comprising running diagnostic testing programs on a diagnostic adapter card coupled to the network computer. For example, PCI management card 200 is

constructed or programmed with software running on it [see Figs. 1&2 and Col. 3, Lines 3-17 and Col. 3, Lines 37-43].

Office Action, dated October 31, 2003. Appellants respectfully disagree. The cited portion of *Congdon* states:

> Attention now is directed to the drawings and particularly to FIG. 2, which illustrates an example PCI management card 200 for managing/evaluating a PCI bus 230 in a host system for correct operation according to the principles of the present invention. An exemplary PCI management card 200 may be both mechanically and electrically PCI-compliant, and a user-friendly, self-contained fault detection device that operates fully in conjunction with a running host system. The exemplary PCI management card 200 may be constructed or programmed to observe input/output (I/O) signals passing through a PCI bus 230 to a host processor 240 and I/O devices such as a mouse, a keyboard, floppy and hard disk(s), and network ports, etc., so as to monitor and report error and failure conditions that may occur on the PCI bus 230.

Congdon, col. 3, lines 3-17.

> Depending on the implementation, software running on the PCI management card 200 may signal locally to a host system or remotely to a remote system (not shown) on a computer network that an anomalous event has occurred, and may communicate with either a host system or a remote system on a computer network as to what type of anomalous event it was.

Congdon, col. 3, lines 37-43. Thus, *Congdon* teaches a PCI management card that monitors signals passing through a PCI bus and reports anomalous events. However, *Congdon* does not teach or suggest running diagnostic testing programs, as recited in claim 1. Simply stated, merely monitoring signals, as taught by *Congdon*, is not equivalent to "running diagnostic testing programs," as in the claimed invention.

With regard to the step of reporting the results from running the diagnostic programs, the Office Action alleges that this feature is taught in the Abstract and in column 3, lines 37-43. Both portions of the reference generally state that a PCI management card monitors and reports anomalies or failures to a local microprocessor. Therefore, *Congdon* reports failures **responsive to the step of monitoring**. *Congdon* fails to teach or suggest the step of reporting results **from running diagnostic testing programs**.

The Office Action also states:

> Congdon further teaches reporting the results from running the diagnostic programs. For example, reporting errors or failures locally or remotely over a computer network [see Abstract and Col. 3, Lines 37-43].

Office Action, dated October 31, 2003. Appellants respectfully disagree. *Congdon* teaches signaling the occurrence of an anomalous event. However, *Congdon* does not teach or suggest running diagnostic testing programs and reporting the **results** from running the diagnostic testing programs. Again, monitoring signals and signaling when an event occurs is not equivalent to "running diagnostic testing programs" and "reporting the results from running the diagnostic testing programs," as recited in claim 1. The Office Action does not proffer any analysis as to why monitoring signals is somehow equivalent to running diagnostic testing programs and **reporting results** of the **diagnostic testing programs**.

With regard to the step of analyzing the results from running the diagnostic programs to determine a cause of the problem, the Office Action alleges that this feature is taught in column 7, line 66, to column 8, line 10. However, the cited portion of *Congdon* generally states that software from the local memory running on the PCI management card may signal either locally to a host system or remotely to a remote system that an anomalous event has occurred on the PCI bus. In addition, such software may further communicate with either a host system or a remote system as to what type of anomalous event occurred, e.g., for analysis purposes and a proactive response, such as providing a host user an opportunity to shut down the host system remotely before the host system crashes.

The Office Action states:

> In addition, Congdon teaches analyzing the results from running the diagnostic programs to determine a cause of the problem. For example, the host computer ascertains the nature of failures or occurred events [see Col. 7, Line 66 - Col. 8, Line 10]. In summary, Congdon teaches a method and system of monitoring/tracking error and fault conditions and testing/diagnosing problems on the PCI bus and associated components in the computer network. Those problems are managed by evaluation for correct operation.

Office Action, dated October 31, 2003. Appellants respectfully disagree. The cited portion of *Congdon* states:

> Depending on the implementation, software from the local memory 216 running on the PCI management card 200 may then signal

> either locally to a host system or remotely to a remote system over a computer network that an anomalous event (fault condition) has occurred on the PCI bus 230. In addition, such software may further communicate with either a host system or a remote system over a computer network as to what type of anomalous event occurred, e.g., for analysis purposes and a proactive response, such as providing a host user or a remote user on a computer network an opportunity, for example, to shut down the host system remotely before the host system crashes.

Congdon, col. 7, line 66, to col. 8, line 10. *Congdon* clearly teaches signaling **only** that an event occurred and what type of event occurred. As evidenced in the reference, the analysis step in *Congdon* occurs in order to allow the host **user** to proactively respond and determine, for example, whether the host system should be shut down. *Congdon* does not teach or suggest a method **in a network computer** for diagnosing a problem comprising analyzing the results **from running the diagnostic testing programs**. The reference also fails to teach or suggest analyzing to determine a **cause** of the problem.

In view of the above, Appellants submit that *Congdon* does not teach each and every feature of independent claims 1, 7, and 17 as is required under 35 U.S.C. § 102 (e). At least by virtue of their dependency on claims 1, 7, and 17, respectively, *Congdon* does not teach each and every feature of dependent claims 2-5, 8-10, 13-15, and 18-21. Accordingly, Appellants respectfully request withdrawal of the rejection of claims 1-5, 7-10, 13-15, and 17-21 under 35 U.S.C. §102 (b).

II. The Prior Art Does Not Teach the Claimed Diagnostic Testing Programs (Group B)

With respect to claim 3, the Office Action states:

> Regarding claim 3, Congdon further teaches the method of claim 1, wherein running diagnostic programs includes running a program to test one of bus timing, bus mastering, direct memory access operations, data and control registers associated with devices connected to a system bus, system memory, timeout functions, a boot flash monitor, input/output integrity for one or more devices selected from a keyboard, a mouse, a graphics adapter, a serial port, a parallel port, a universal serial bus port, a microphone, a speaker, and an audio output port (i.e., executing a diagnostic program to test bus/host clock, to test a boot flash, to test memory and to test registers, to test I/O devices connected to the bus,...) [see Abstract and Col. 3, Lines 3-17 and Col. 5, Lines 25-67 and Col. 7, Lines 7-65 and Col. 9, Line 61 – Col. 10, Line 5].

Office Action, dated October 31, 2003. Appellants respectfully disagree. The Office Action cites numerous arbitrary, albeit lengthy, portions of the reference. However, *Congdon* teaches **monitoring** a PCI bus. There is no teaching in the cited portions or any other portions of *Congdon* of running **diagnostic testing** programs for specifically testing bus timing, bus mastering, direct memory access operations, data and control registers associated with devices connected to a system bus, system memory, timeout functions, a boot flash monitor, input/output integrity for one or more devices selected from a keyboard, a mouse, a graphics adapter, a serial port, a parallel port, a universal serial bus port, a microphone, a speaker, and an audio port, as recited in claim 3. Despite the allegations in the Office Action, the applied prior art fails to teach each and every claim limitation; therefore, claim 3 is not anticipated by *Congdon*.

III. The Prior Art Does Not Teach Testing an Integrity of Input/Output Ports in the Network Computer by Connecting a Wrap Cable (Group C)

With respect to claim 10, the Office Action states:

> Regarding claim 10, Congdon further teaches the diagnostic adapter card of claim 8, wherein an integrity of a first input/output port in the network computer and a second input/output port in the network computer is tested by connecting a wrap cable between the first input/output port and the second input/output port (i.e., testing the integrity of connection) [see Col. 1, Line 36 – Col. 2, Line 1].

Office Action, dated October 31, 2003. Applicant respectfully disagrees. The cited portion of *Cogdon* states:

> When a PCI bus is used as an interconnect transportation mechanism in a host system (e.g., personal computer or server), data transfer between, a processor, input/output (I/O) devices, system memory and I/O device is executed at high speed. However, a PCI bus is often a common cause of errors and/or crashing a host system. Many common failures of PCI bus are caused in conjunction with the process of adding or removing add-on adapter cards from the host system which may disrupt an existing electrical connection or form an incomplete new electrical connection, or which may alter the air flow and cooling characteristics inside the host system, or with a new adapter card which may not be well-behaved, and may have driving signals active at inappropriate times. Such failure may compromise the integrity of the host system. Any misbehaved agent on the PCI bus, for example, mayb spuriously drive the PCI reset signal, the PCI

> clock signal, or any of other PCI signals at any time, possibly causing a host system crash. Consequently, monitoring the PCI bus for correct operation in a host system is desirable. One approach to monitoring the PCI bus operation is to use standard electronic instruments such as PCI bus analyzers or laboratory analysis and diagnostic tools. An example of a PCI bus analyzer used for analyzing a PCI bus operation in a host computer on test bench in laboratory environment as shown in FIG. 1. The PCI bus analyzer 20 is coupled to a PCI bus 13 of a host system 11 by way of a cable 12 and a PCI bus analyzer card 10, and operates in conjunction with an analysis software (installed in PCI bus analyzer 20) for probing the PCI bus 13 to measure and display the PCI bus operation. The PCI bus analyzer 20 may be connected to an add-on card 10 for insertion directly onto a PCI bus 13 to analyze the overall performance of the PCI bus 13.

Neither the cited portion nor any other portion of *Congdon* teaches or suggests "wherein an integrity of a first input/output port in the network computer and a second input/output port in the network computer is tested by connecting a wrap cable between the first input/output port and the second input/output port," as recited in claim 10. There is no mention anywhere in *Congdon* of testing the integrity of an input/output port or connecting a **wrap cable** between two input/output ports of a network computer. In fact, *Congdon* does not mention a **network computer**, as recited in the present claims. Despite the allegations in the Office Action, the applied prior art fails to teach each and every claim limitation; therefore, claim 10 is not anticipated by *Congdon*.

Therefore, Appellants respectfully request withdrawal of the rejection of claims 1-5, 7-10, 13-15, and 17-21 under 35 U.S.C. § 102.

IV. The Prior Art Does Not Suggest Analyzing Results from Running a Diagnostic Testing Program as Specifically Claimed (Group D)

The Office Action rejects claims 6, 16, and 22 under 35 U.S.C. § 103 (a) as being unpatentable over *Congdon* in view of *Pickreign et al.* (U.S. Patent No. 6,539,338). This rejection is respectfully traversed.

First, Appellants point out that claims 6, 16, and 22 are directly or indirectly dependent on claims 1, 7, and 17, respectively. Therefore, Appellants respectfully submit that claims 6, 16, and 22 are allowable for at least the same reasons set forth with respect to claims 1, 17,and 22. Additionally, Appellants submit that as to claims 6, 16, and 22, the Office Action acknowledges

that *Congdon* fails to teach or suggest that the cause of the problem includes detecting a faulty software program. The Office Action further alleges, however, that the feature is "old and well-known in the art as disclosed by *Pickreign* [see Col. 2, lines 9-20]."

However, the *Pickreign* reference is directed to implementing a **self-diagnostic** capability within a network interface adapter (NIA). Errors detected during execution of self-diagnostic routines are reported to the host computer. If the error is within the NIA's flash RAM, code stored in the host computer may be downloaded to correct the errant code. Therefore, even if one were to combine *Congdon* and *Pickreign*, the combination would not form the presently claimed invention. Rather, a combination of *Congdon* and *Pickreign* would result in a computer with a monitoring adapter card and a separate network interface adapter with self-diagnostic capability. The monitoring adapter card would be incapable of detecting a faulty software program in *Pickreign*.

On the other hand, a person of ordinary skill in the art would not be led to modify the monitoring adapter card of *Congdon* so that the adapter card could monitor the operation of a network interface adapter and then combine the modified adapter card with the self-diagnostic network interface adapter of *Pickreign*, because the modification contradicts to the intended purpose of the teachings of *Pickreign*. A *prima facie* case of obviousness cannot be properly based upon a prior art reference if the prior art reference requires some modification in order to meet the claimed invention and such a modification destroys the intended purpose or function of the disclosed invention in the reference. As such, even a combination of *Congdon* and *Pickreign* fails to render obvious the features of claims 6, 16, and 22 of the present invention. Reconsideration and withdrawal of the § 103 (a) rejection of dependent claims 6, 16, and 22 is respectfully requested.

V. The Prior Art Does Not Suggest Converting a Format of Data Without Changing Content of the Data (Group E)

The Office Action rejects claim 12 under 35 U.S.C. § 103 (a) as being unpatentable over *Congdon* in view of *Ellis et al.* (U.S. Patent No. 6,256,687). This rejection is respectfully traversed.

With respect to dependent claim 12, Appellants first point out that this claim is indirectly dependent upon claim 7 and directly dependent upon claim 10. As such, claim 12 is

allowable for at least the same reasons set forth above with respect to claims 7 and 10. Additionally, the Office Action acknowledges that *Congdon* does not teach the diagnostic adapter card wherein the wrap cable between the first input/output port and the second input/output port converts a format of the data without changing content of the data. Appellants respectfully submit that *Ellis* fails to cure the deficiencies of *Congdon*. The Office Action alleges that the features of claim 12 are taught in column 3, lines 44-50, and column 15, lines 12-30, of *Ellis*. However, as evidenced in these cited portions, although *Ellis* generally describes state machines that allow commands from the host processor to the parallel port interface device to be converted into USB signals, there is no indication in *Ellis* that the format of the data is converted **without changing the content of the data.**

Furthermore, *Congdon* and *Ellis*, taken alone or in combination, fail tot each or suggest such a feature in a wrap cable between a first input/output port and a second input/output port for testing an integrity of the input/output ports, as in the present invention. As such, Appellants respectfully submit that the combination of *Congdon* and *Ellis* fails to teach or render obvious dependent claim 12 of the present invention.

Therefore, the rejection of claims 6, 16, 22, and 12 under 35 U.S.C. § 103 is overcome.

VI. The Prior Art, When Considered as a Whole, Fails to Teach or Suggest the Present Invention (Groups D and E)

The Office Action states:

> In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See ***In re Keller, 642F. 2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F. 2d 1091, 231 USPQ 375 (Fed. Cir. 1986)***. Applicant obviously attacks references individually without taking into consideration based on the teaching of combinations of references as shown in the following section.

Office Action, dated October 31, 2003. Appellants respectfully disagree. If the references, individually or in any combination, fail to teach or suggest the features alleged in the Office Action, then the rejection is improper. Therefore, individual treatment of the references is necessary to show that the references fail to teach the features for which they are cited. As such, Appellants submit that the **combinations** of references proposed in the Office Action fail to

render the claims obvious, because the references fail in their teachings.

VII. Each Claim Must be Treated on Its Own Merits

The Office Action further states:

> Claims 2-6, 8-10, 12-16 and 18-22 are rejected at least by virtue of their dependency on independent claims and by other reasons set forth above.

Office Action, dated October 31, 2003. Appellants respectfully disagree. Dependent claims **cannot** be rejected by virtue of their dependency with respect to prior art. To the contrary, dependent claims further limit the claims on which they depend, as required by 35 USC § 112, fourth paragraph. These further limitations must be individually addressed with respect to the applied prior art; otherwise, the Office Action fails to establish a *prima facie* case of anticipation or obviousness.

VIII. Conclusion

In view of the above, Appellants respectfully submit that the rejections of claims 1-10 and 12-22 are overcome. Accordingly, it is respectfully urged that the rejections of claims 1-10 and 12-22 not be sustained.

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APPENDIX OF CLAIMS

The text of the claims involved in the appeal reads:

1. A method in a network computer for diagnosing a problem, the method comprising the steps of:

running diagnostic testing programs on a diagnostic adapter card coupled to the network computer;

reporting the results from running the diagnostic testing programs; and

analyzing the results from running the diagnostic testing programs to determine a cause of the problem.

2. The method of claim 1, wherein the diagnostic adapter card is coupled to the network computer by way of an open slot on a PCI (Peripheral Component Interconnect) bus in the network computer.

3. The method of claim 1, wherein running diagnostic testing programs includes running a program to test one of bus timing, bus mastering, direct memory access operations, data and control registers associated with devices connected to a system bus, system memory, timeout functions, a boot flash monitor, input/output integrity for one or more devices selected from a keyboard, a mouse, a graphics adapter, a serial port, a parallel port, a universal serial bus port, a microphone, a speaker, and an audio output port.

4. The method of claim 1, wherein reporting results includes one of sending data to a remote workstation, storing information in a log file, and displaying a result code on a display device connected to the diagnostic adapter card.

5. The method of claim 1, wherein analyzing results includes one of detecting the absence of a response from a component, detecting a discrepancy between an expected response and an actual response, and recognizing errors in signal timing.

6. The method of claim 1, wherein analyzing the results from running the diagnostic testing programs includes one of detecting a nonfunctioning component, detecting an intermittently failing component, and detecting a faulty software program.

7. An apparatus in a network computer for diagnosing a problem, the apparatus comprising:

a processing means for executing diagnostic testing programs on the diagnostic adapter card;

a reporting means for reporting results from executing the diagnostic testing programs;

an analyzing means for analyzing the results from executing the diagnostic testing programs to determine a cause of the problem.

8. The apparatus of claim 7, wherein the apparatus comprises a diagnostic adapter card installed in an open slot on a PCI (Peripheral Component Interconnect) bus in the network computer and one or more wrap cables.

9. The diagnostic adapter card of claim 8, wherein the diagnostic adapter card includes a processing means to execute the diagnostic testing programs, a read only memory to boot the processing means, a random access memory to store diagnostic testing programs and data to be processed by the processing means, a first external connector to interface with a reporting device, and a second external connector to connect a wrap cable to send or receive sample data.

10. The diagnostic adapter card of claim 8, wherein an integrity of a first input/output port in the network computer and a second input/output port in the network computer is tested by connecting a wrap cable between the first input/output port and the second input/output port.

12. The diagnostic adapter card of claim 10, wherein the wrap cable between the first input/output port and the second input/output port converts a format of the data without changing content of the data.

13. The diagnostic adapter card of claim 10, wherein the processing means for executing diagnostic testing programs includes executing a program to test one of bus timing, bus mastering, direct memory access operations, data and control registers associated with devices connected to the system bus, system memory, timeout functions, system processor sequencing, a

boot flash monitor, and input/output integrity for one or more devices selected from a keyboard, a mouse, a graphics adapter, a serial port, a parallel port, a universal serial bus port, a microphone, a speaker, and an audio output port.

14. The diagnostic adapter card of claim 10, wherein the reporting means for reporting results includes one of sending data to a remote workstation, storing information in a log file, and displaying data on a display device connected to the diagnostic adapter card.

15. The diagnostic adapter card of claim 10, wherein the analyzing means for analyzing results includes one of recognizing known error codes, detecting the absence of a response from a component, and recognizing errors in signal timing.

16. The diagnostic adapter card of claim 10, wherein the analyzing means for analyzing results includes one of detecting a nonfunctional component, detecting an intermittent component, and detecting a faulty software program.

17. A computer program product for diagnosing a problem, the computer program product comprising:

instructions for diagnostic testing programs on a diagnostic adapter card;

instructions for reporting results from executing the diagnostic testing programs;

instructions for analyzing the results from executing the diagnostic testing programs to determine a cause of the problem.

18. The computer program product of claim 17, wherein instructions for executing diagnostic testing programs include instructions for executing an integrity test of a first input/output port and a second input/output port that are connected by a wrap cable between the first input/output port and the second input/output port.

19. The computer program product of claim 17, wherein the instructions for executing diagnostic testing programs includes executing a program to test one of bus timing, bus mastering, direct memory access operations, data and control registers associated with devices connected to the system bus, system memory, timeout functions, system processor sequencing, a boot flash monitor, and input/output integrity for one or more devices selected from a keyboard, a mouse, a graphics adapter, a serial port, a parallel port, a universal serial bus port, a microphone, a speaker, and an audio output port.

20. The computer program product of claim 17, wherein the instructions for reporting results includes one of sending data to a remote workstation, storing information in a log file, and displaying information on a display device connected to the diagnostic adapter card.

21. The computer program product of claim 17, wherein the instructions for analyzing results includes one of detecting the absence of a response from a component, detecting a discrepancy between an expected response and an actual response, and recognizing errors in signal timing.

22. The computer program product of claim 17, wherein the instructions for analyzing the results includes one of detecting a nonfunctional component, detecting an intermittently failing component, and detecting a faulty software program.